

FIG. 1

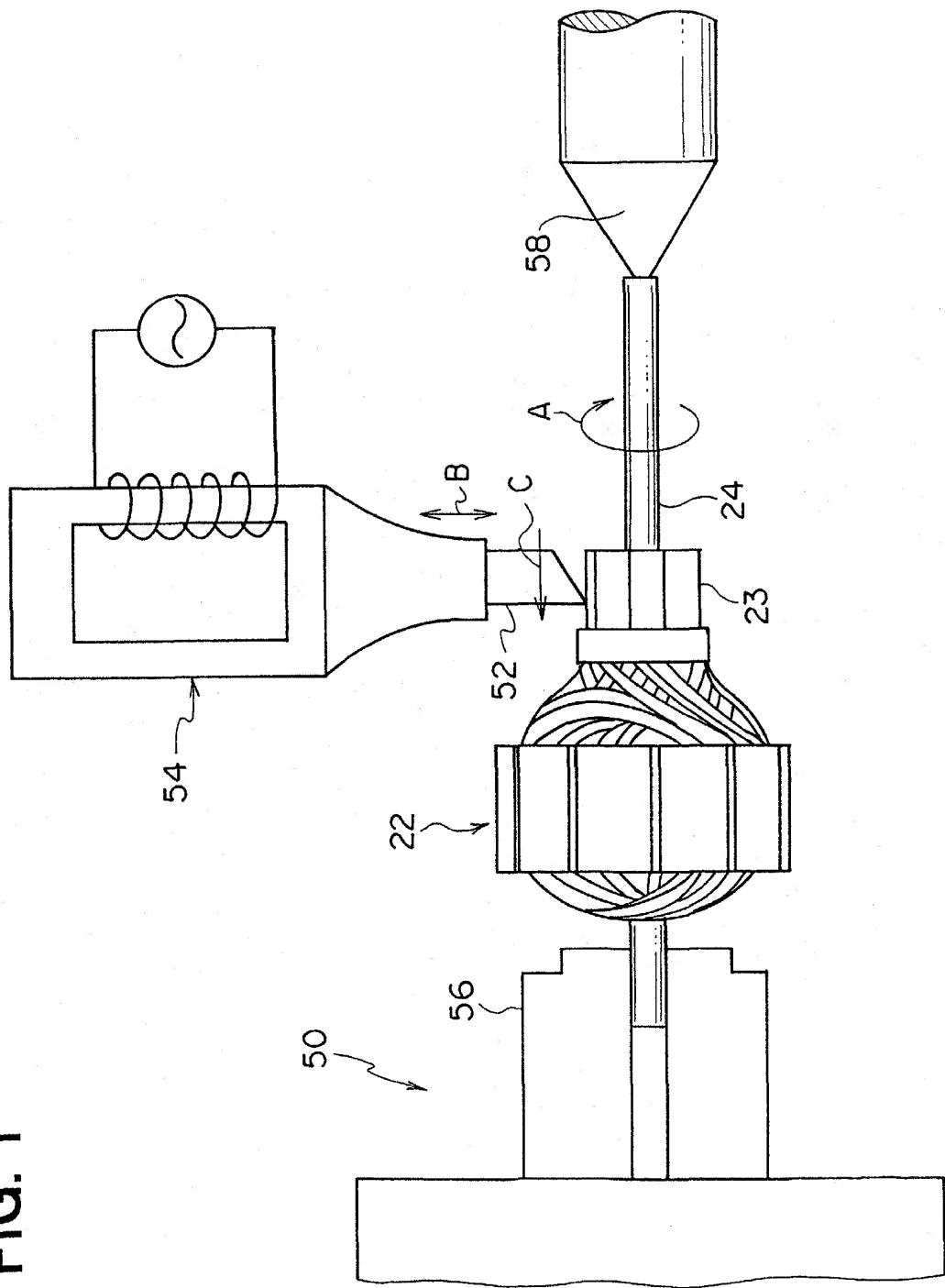


FIG. 2

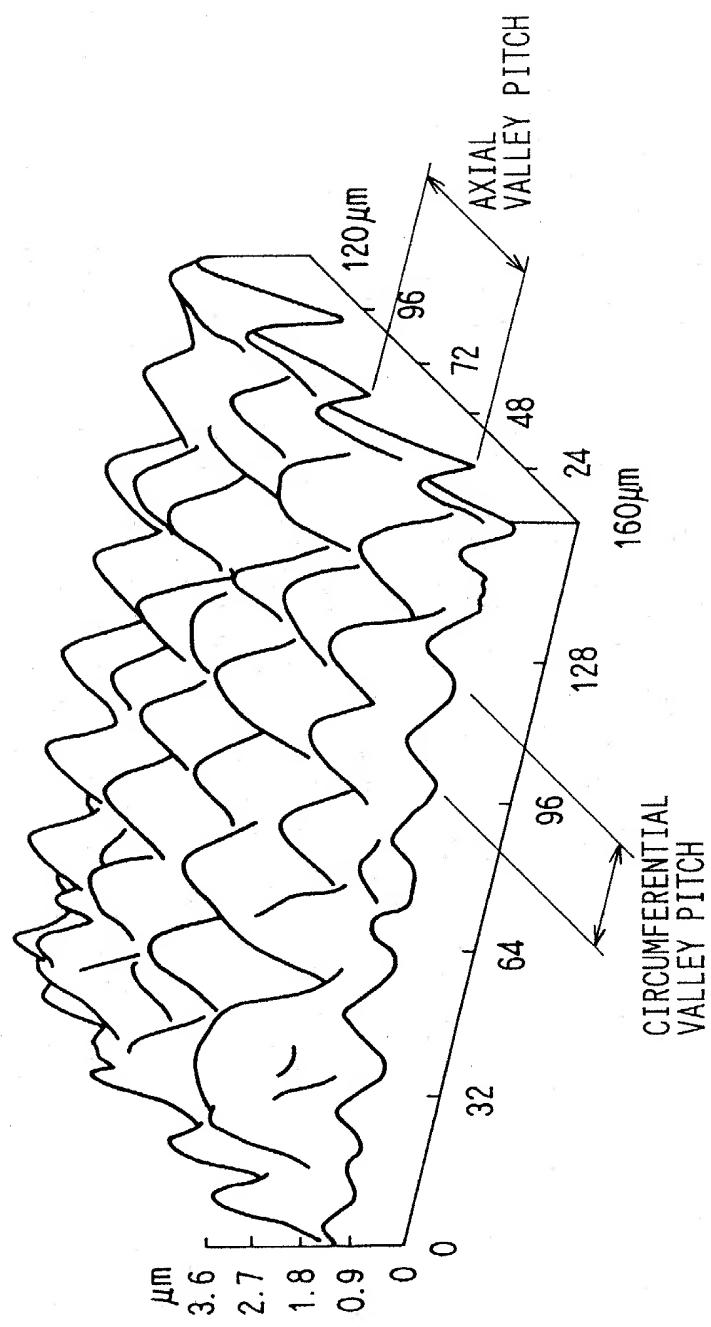


FIG. 3

EFFECTS OF SURFACE ROUGHNESS OF COMMUTATOR

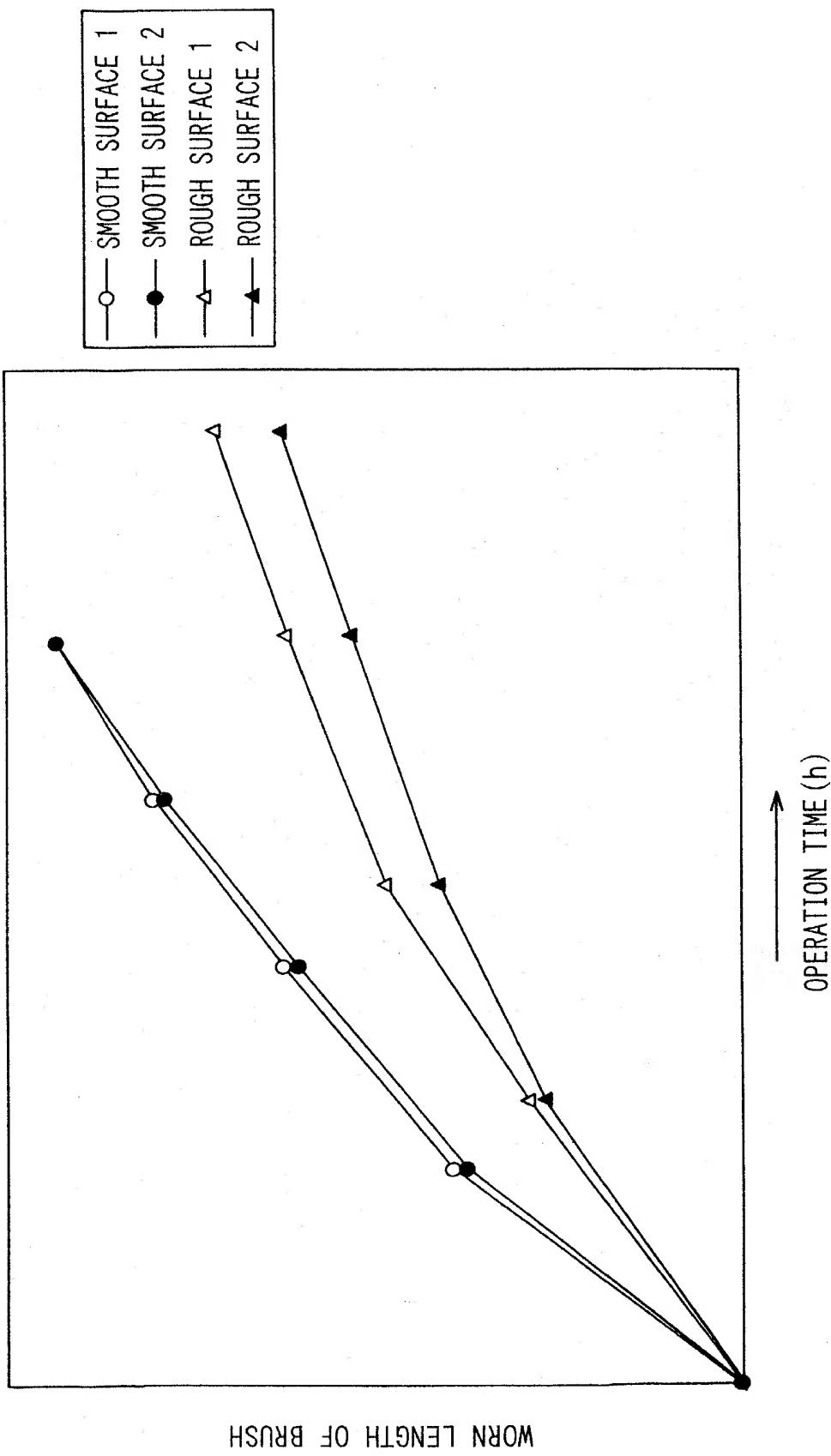


FIG. 4A

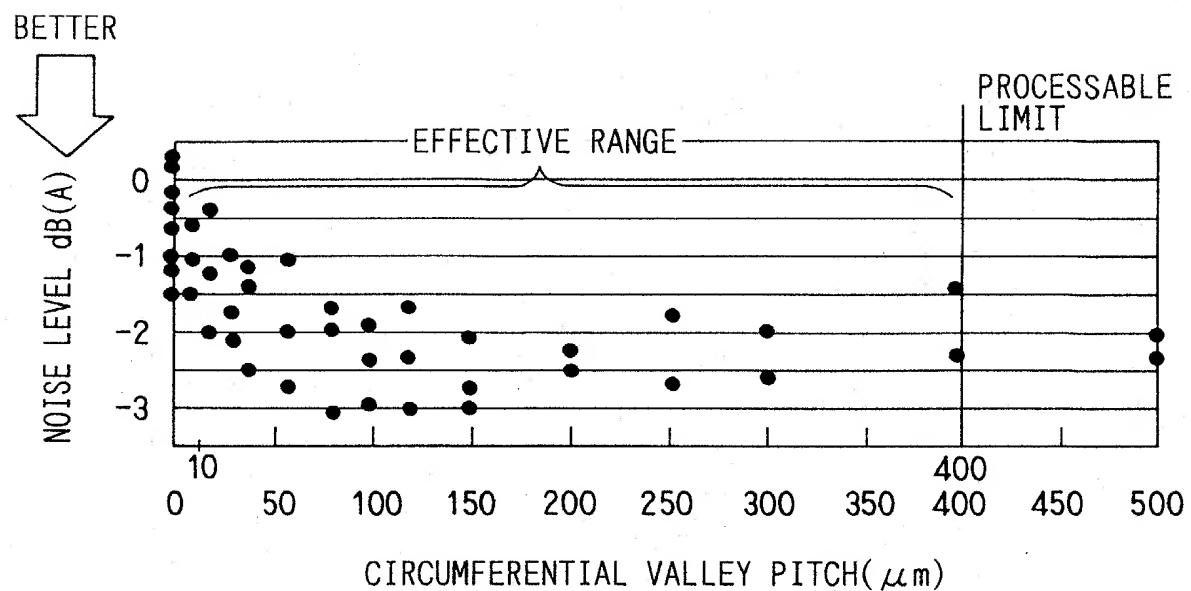


FIG. 4B

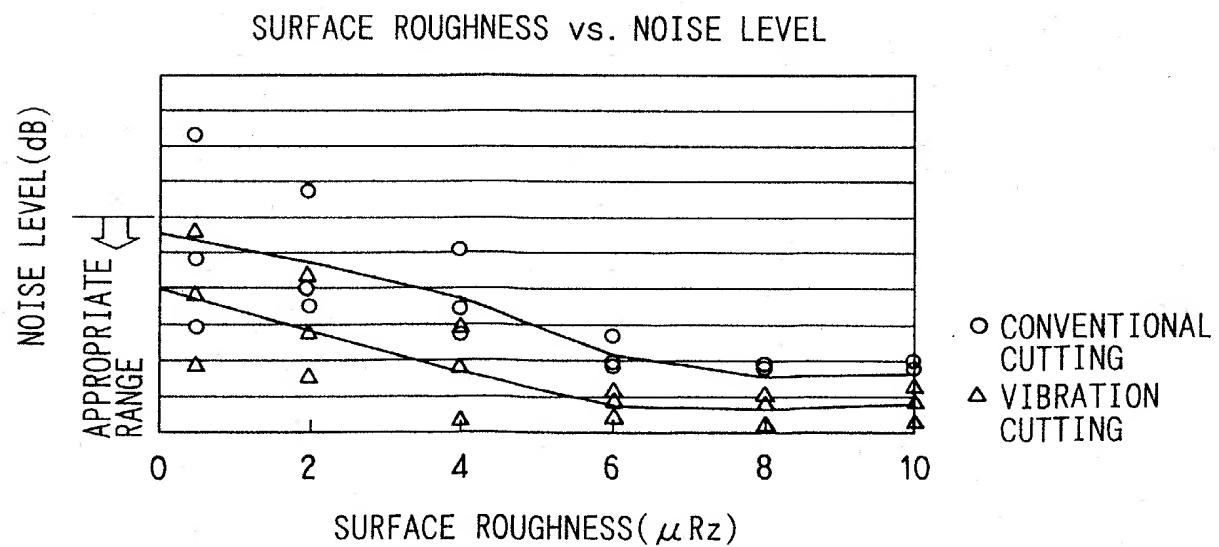
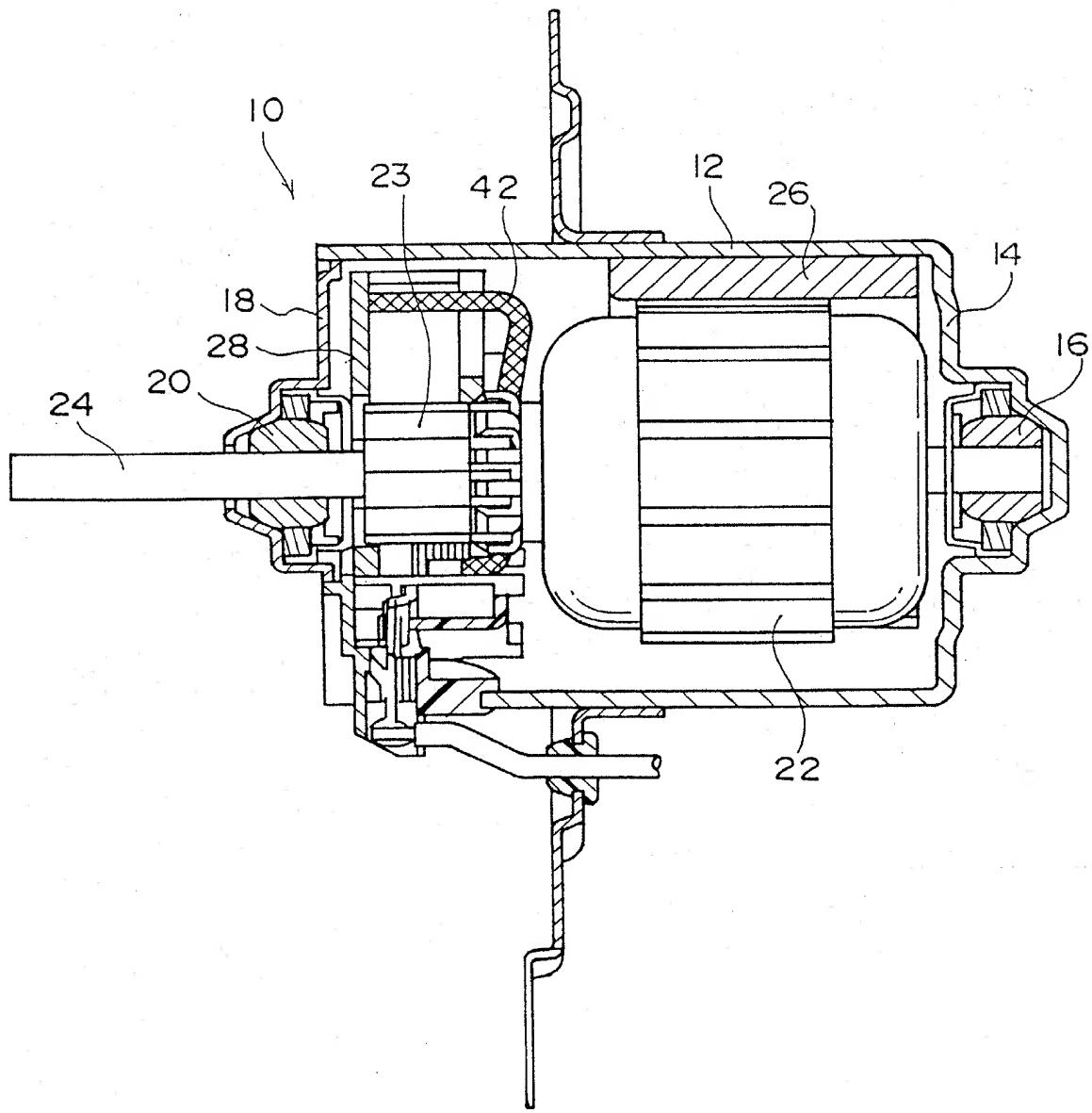
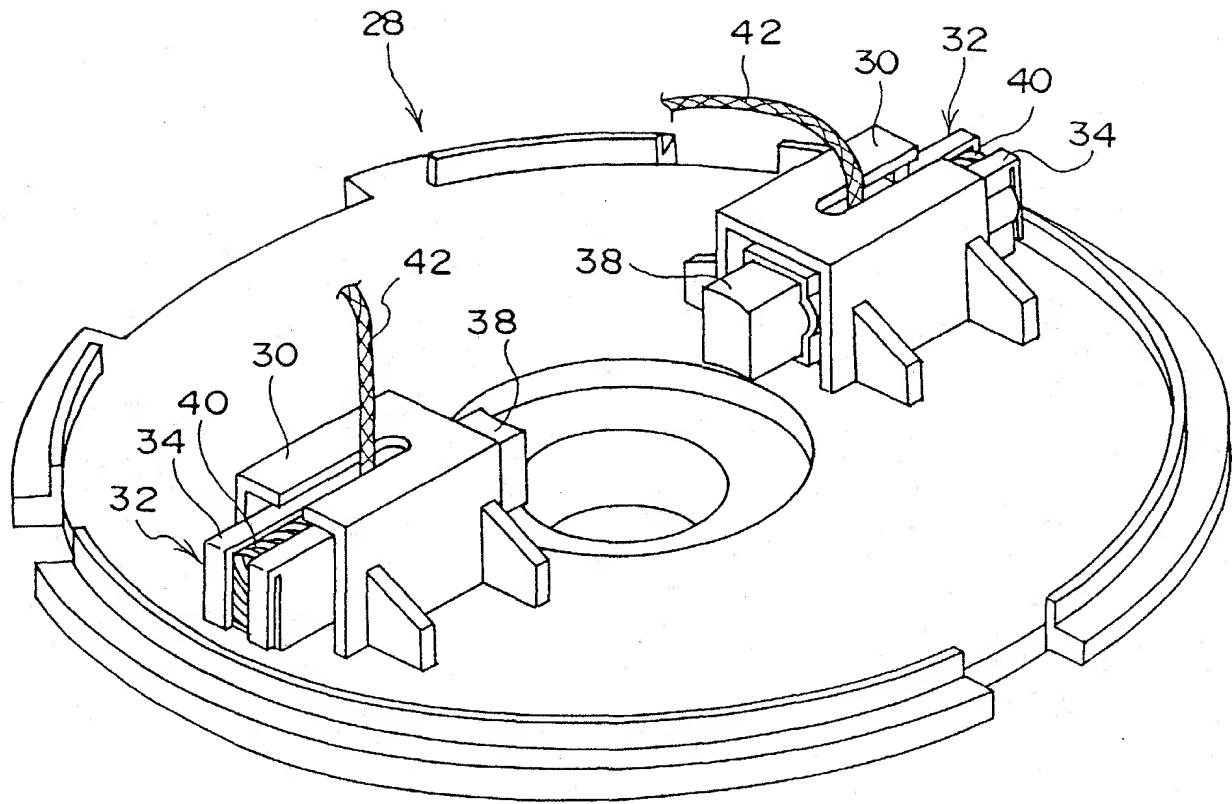


FIG. 5



**FIG. 6**



50 51 52 53 54 55 56 57 58 59 60

**FIG. 7**

